

SCREENABLE MOISTURE-PASSIVATED PLANAR INDEX-GUIDED VCSEL

ABSTRACT

Screenable vertical cavity surface emitting lasers (VCSELs) and methods of
5 manufacturing the same are described. These systems and methods address the
unique susceptibility of these devices to damage that otherwise might be caused
by moisture intrusion into the etch holes that are used to form the index-guiding
confinement regions. In one aspect, a VCSEL includes a vertical stack structure
having a top surface. The vertical stack structure includes a top mirror, a bottom
10 mirror, and a cavity region that is disposed between the top mirror and the
bottom mirror and includes an active light generation region. At least one of the
top mirror and the bottom mirror has at least one layer defining an aperture
region. The vertical stack structure defines at least one sidewall area extending
from the top surface to at least a depth corresponding to the aperture region. The
15 VCSEL further includes a defect indicator system that is disposed in a screening
region at the sidewall area. The defect indicator system includes an indicator
layer with a chemically alterable optical property, and a barrier layer overlying
the indicator layer.